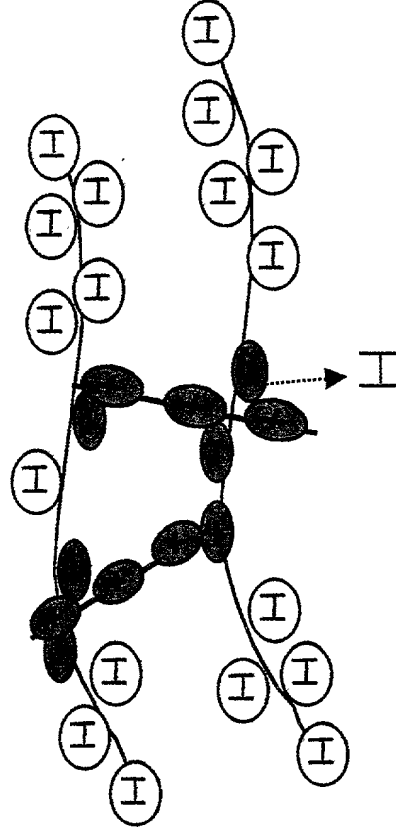


Figure 1.
Interpolyelectrolyte Complex (IPEC)
Dry Strength Enhancement
Polyacrylic acid example



- Neutralized anionic COO⁻ acid groups, .33:1 to protonated acid groups
- ⊖ Functional COOH acid groups, 3:1 to anionic groups
- Cationic polymer, matched 1:1 to anionic groups
- H Proton from acid group, creating neutralized anionic group.

Figure 2.
IPEC plus Cross-linking and Binder
Wet and Dry Strength
Functional groups attach to binder at elevated temperature..

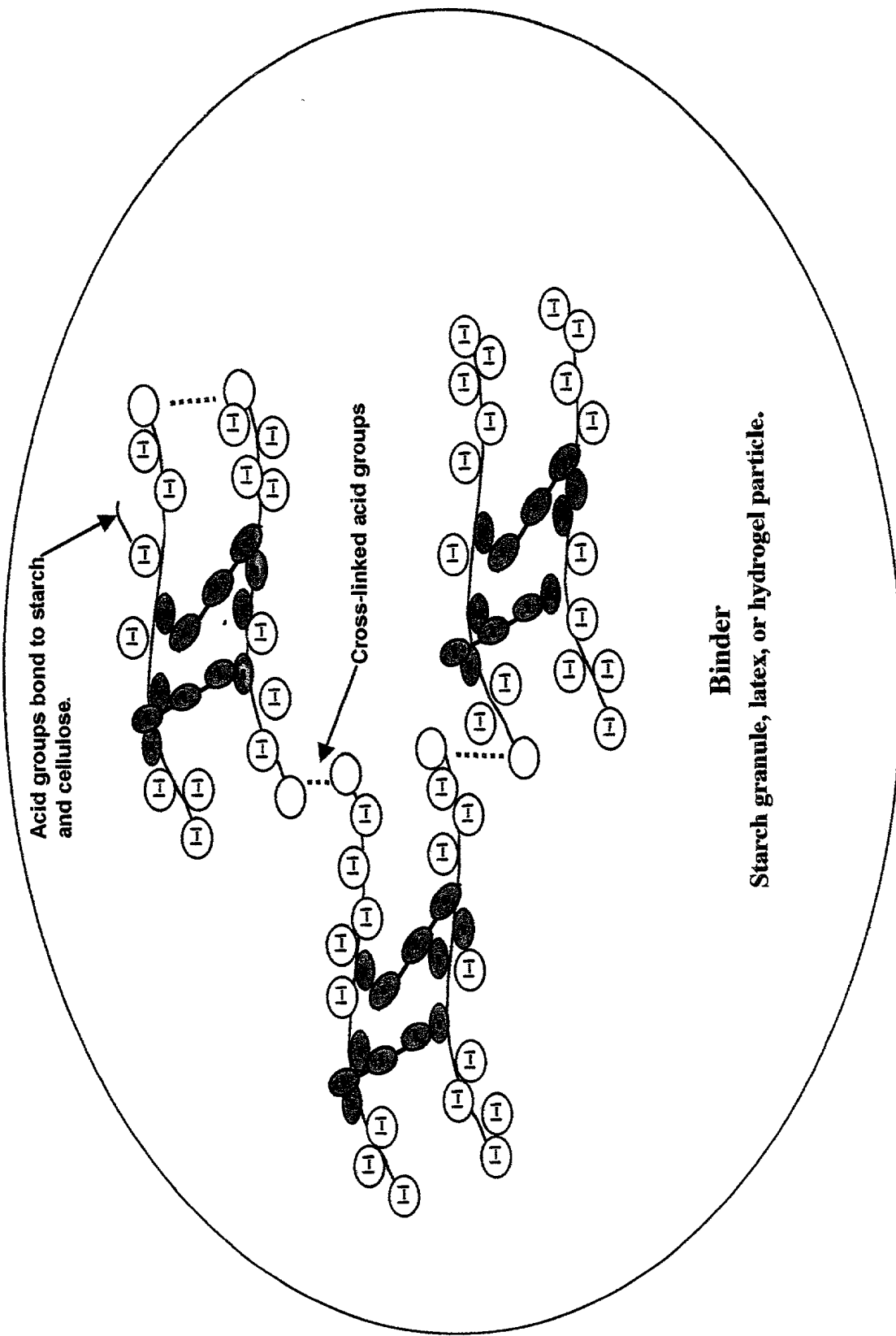


Figure 3.
Polyelectrolyte Surfactant Complexes (PESCs)
Cationic Surfactant with Anionic polymer.
Wet and Dry Strength

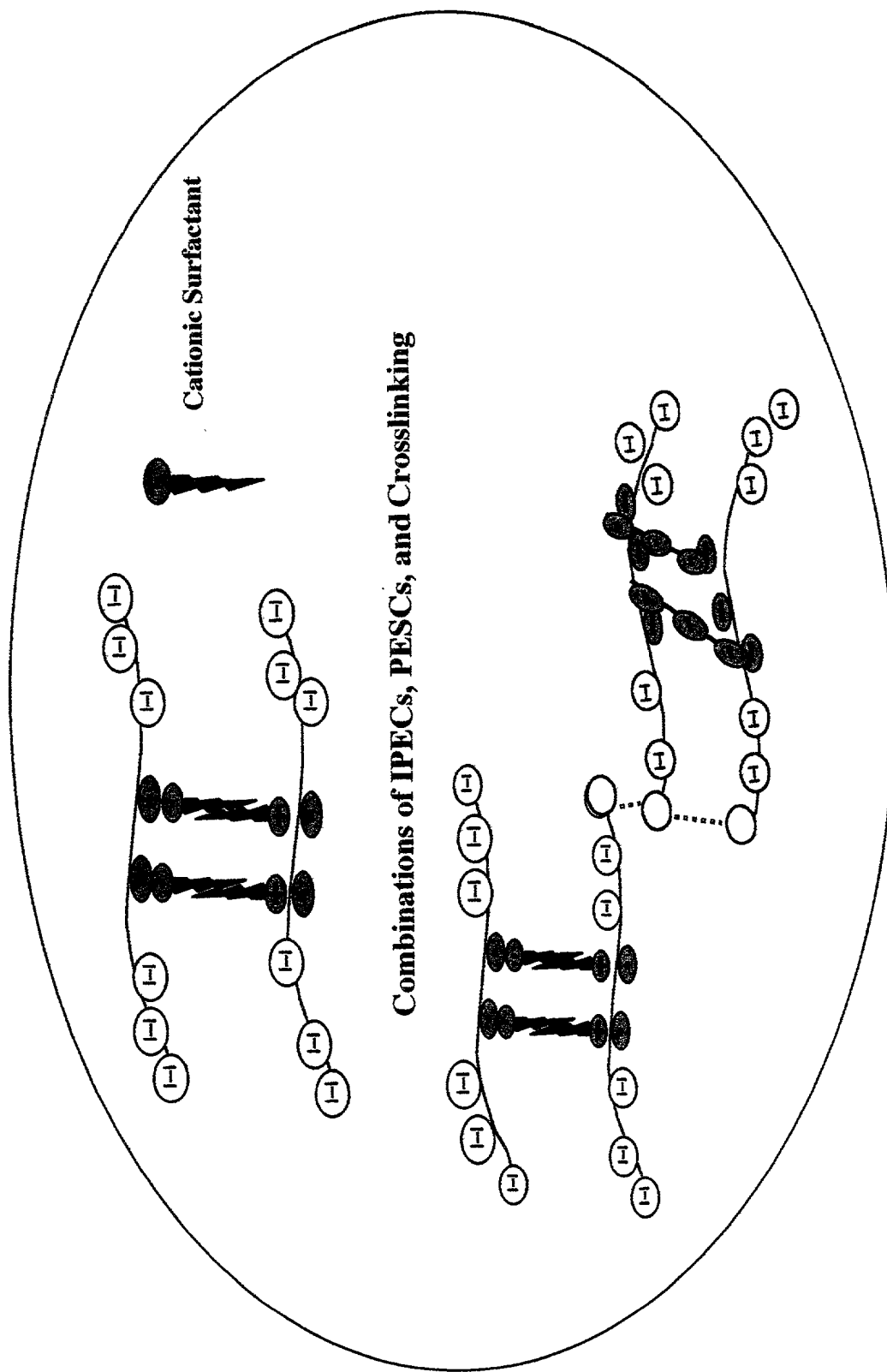


Figure 4
Synergistic Effect of IPEC and Starch on Dry Strength

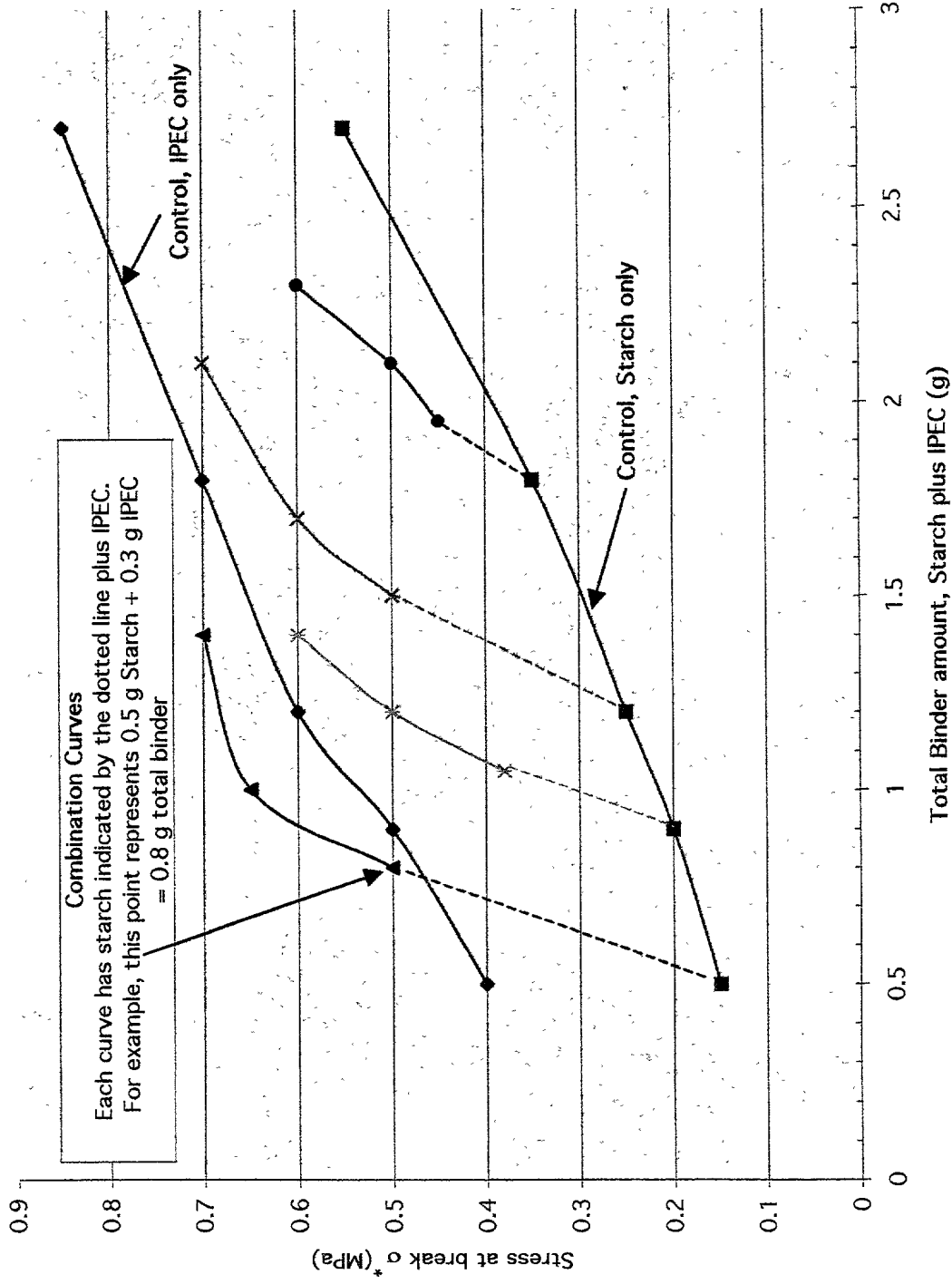


Figure 5
Synergistic Effect of PES and Starch on Dry Strength

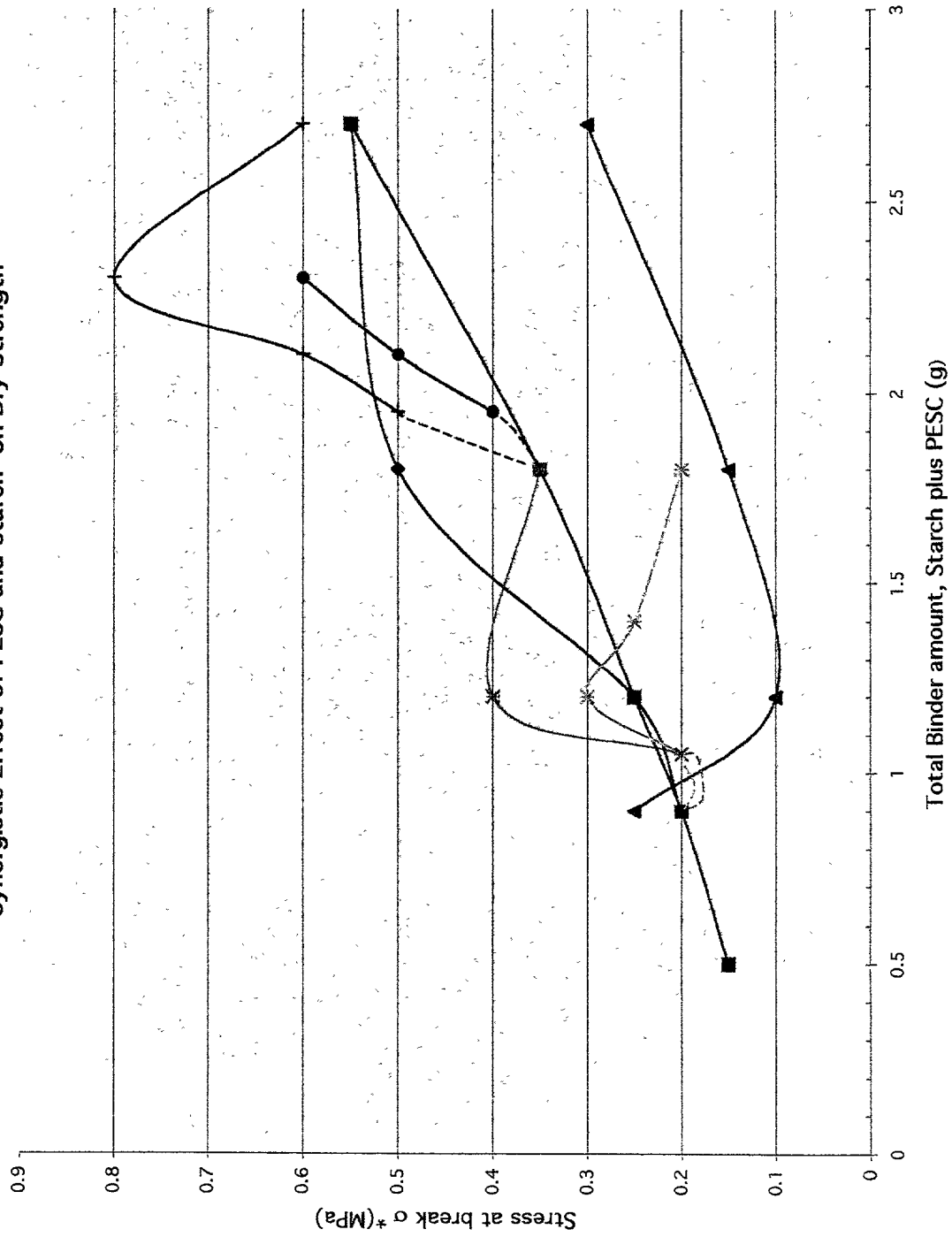


Figure X6
Synergistic Effect of PESC and Starch on Wet Strength

